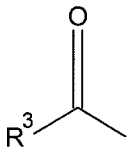
ATTACHMENT B
Amendments to the Claims

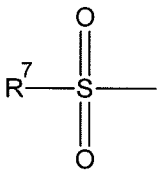
This listing of claims will replace all prior versions, and listings, of claims in the application.

1. (Currently Amended) A method for arylating a ~~nuclophile~~ nucleophile, comprising reacting the nucleophile with a substrate aromatic compound, ArX, in the presence of a copper catalyst, a base and water, wherein Ar is aryl, heteroaryl or alkenyl, X is halo, sulfonate or phosphonate, the base comprises an alkaline earth carbonate, bicarbonate, hydroxide or phosphate, and the copper catalyst comprises a copper atom or ion and a ligand.

2. (Original) The method of claim 1, wherein the nucleophile comprises a HN-containing heterocycle or a HN-containing compound according to the formula $HN(R^1)R^2$, wherein R^1 is H, alkyl or aryl, and R^2 is a substituent according to the formula:



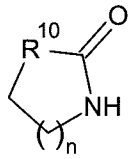
wherein R^3 is H, alkyl, aryl, heteroaryl, alkenyl, $-OR^5$ or $-NR^6{}_2$, and R^5 and R^6 are each independently alkyl, aryl, or a substituent according to the formula:



wherein R^7 is alkyl or aryl.

3. (Original) The method of claim 2, wherein the nucleophile comprises a HN-containing heterocycle selected from triazoles, pyrroles, pyrazoles, imidazoles, indoles, azaindoles, benzotriazoles, benzimidazoles, indazoles, and carbazoles, each of which may be substituted or unsubstituted.

4. (Currently Amended) The method of claim 2, wherein the nucleophile comprises a HN-containing heterocycle ~~comprises~~ comprising a monocyclic system according to the formula:



wherein n is 0 or an integer of from 1 to 3 and R^{10} is substituted alkyl, substituted N, or O.

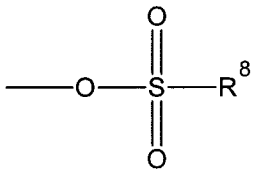
5. (Original) The method of claim 4, wherein nucleophile comprises an amide, a carbamate, a urea, or a sulfonamide.

6. (Original) The method of claim 5, wherein nucleophile comprises benzamide, 4-aminobenzamide, cyclohexylamide, trans-cinnamamide, N-phenylacetamide, N-methylformamide, N-benzylformamide, N-cyclohexylformamide, N-phenyl-*tert*-butyl carbamate, N-methylimidazolidinone, or p-toluenesulfonamide.

7. (Original) The method of claim 1, wherein Ar comprises a phenyl ring which is, other than the X substituent, unsubstituted or is further substituted, in addition to the X substituent, on one or more carbons of the ring with one or more substituent groups each independently selected from alkyl, alkoxy, alkenyl, alkynyl, aryl, heteroaryl, cyano, carbonyl, amino, amido or sulfonyl.

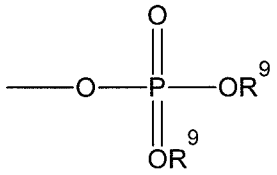
8. (Original) The method of claim 1, wherein X is a halo.

9. (Original) The method of claim 1, wherein X is a sulfonate group according to the formula:



wherein R^8 is alkyl, aryl, fluoroalkyl, preferably trifluoromethyl, perfluoroalkyl.

10. (Original) The method of claim 1, wherein X is a phosphonate group according to the formula:



wherein each R^9 is independently alkyl or aryl.

11. (Original) The method of claim 1, wherein ArX comprises 4-bromobenzonitrile, 4-N,N'-dimethyl-bromoaniline, 2-bromothiophene, 3-bromoquinoline,

1-nitro-2-iodobenzene, 4-chlorotoluene, 4-bromofluorobenzene, 2-bromoanisole, 4-iodoaniline, 3-bromoacetophenone, or 4-bromothioanisole.

12. (Original) The method of claim 1, wherein the copper atom or ion is derived from copper metal, from Cu_2O or from a copper salt selected from CuCl, CuBr, $CuBr_2$ and CuI.

13. (Original) The method of claim 1, wherein the ligand comprises a 1,2-diamine compound.

14. (Original) The method of claim 1, wherein the ligand comprises 1,2-di(aminomethyl)cyclohexane, N,N'-dimethylethylenediamine, or 1-propyl-1,2-N,N'-dimethylethylenediamine.

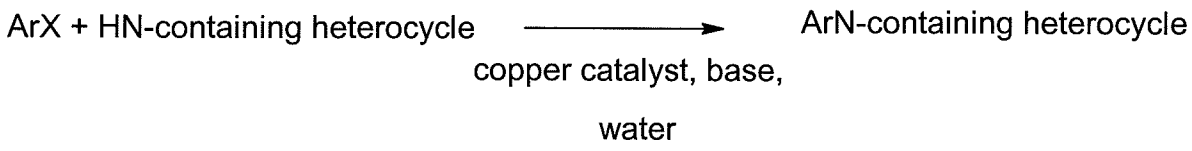
15. (Original) The method of claim 1, wherein the copper catalyst is present in the reaction mixture as complex comprising the copper atom or ion and the ligand.

16. (Original) The method of claim 1, wherein the copper catalyst is present in an amount of from about 0.01 to about 10 mole%, based on the amount of limiting reactant.

17. (Original) The method of claim 1, wherein the reaction is conducted in the presence of from about 0.8 to 3 equivalents of ArX, based on the amount of nucleophile.

18. (Original) The method of claim 1, wherein the reaction is conducted in the presence of from about 1 to about 80 percent by volume water, based on the total volume of reaction mixture.

19. (Original) A method for arylating a HN-containing heterocycle, comprising reacting the HN-containing heterocycle with a substrate aromatic compound, ArX, according to the reaction scheme:



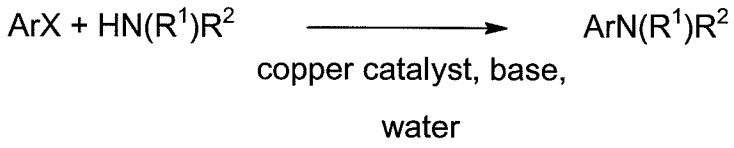
wherein Ar is aryl, heteroaryl or alkenyl,

X is halo, sulfonate or phosphonate,

the base comprises an alkaline earth carbonate, bicarbonate, hydroxide or phosphate, and

the copper catalyst comprises a copper atom or ion and a ligand.

20. (Original) A method for arylating a HN-containing compound according to the formula $HN(R^1)R^2$, comprising reacting the HN-containing compound with a substrate aromatic compound, ArX, according to the reaction scheme:

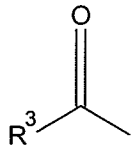


wherein Ar is aryl, heteroaryl or alkenyl,

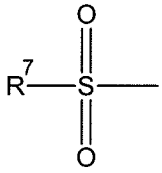
X is halo, sulfonate or phosphonate

R^1 is H, alkyl or aryl

R^2 is according to the formula:



wherein R^3 is H, alkyl, aryl, heteroaryl, alkenyl, $-OR^5$ or $-NR^6_2$, and R^5 and R^6 are each independently alkyl, aryl, or



wherein R^7 is alkyl or aryl,

the base comprises an alkaline earth carbonate, bicarbonate, hydroxide or phosphate, and

the copper catalyst comprises a copper atom or ion and a ligand.

21. (New) A method of claim 1, wherein the base component is magnesium bicarbonate, potassium carbonate, cesium carbonate, potassium phosphate, sodium hydroxide and potassium hydroxide.

22. (New) A method of claim 21, wherein the base is KOH or K_3PO_4.